INTERFACES
IEEE-488/IEC 625
RS232C/V24

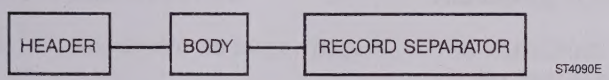
PM2525
SYSTEM MULTIMETER

4822 872 30384 880202

1. PROGRAMMING

1.1 Interface programming

Coding syntax



Note: All codes and commands are valid for both interfaces unless otherwise specified.

FUNCTION	ISO 7-BIT CODE	DESCRIPTION
SERVICE REQUEST (IEEE/IEC)	MSR_n[n][n]	Setting of the service request mask. n[n][n] is the decimal equivalent of the mask bit pattern.
SEPARATORS input/output	SPR_nn[,nn]	Setting of the separators. nn is the decimal equivalement of a character of the ISO code table. (decimal equivalent 27 (ESC) is not allowed).
IDENTITY	ID_?	On receipt of this command the identity is output (PM2525x Syy).
INTERFACE TEST	TSI_U TSI_<dec.170> TSI_CHR$(170)	On receipt of these commands a self test is performed. (U=with service request) (<dec.170> means without service). 170 is the decimal value and can be programmed on most controllers with CHR$(170).

Note: [ ] means optional

PHILIPS

PROGRAMMING cont.

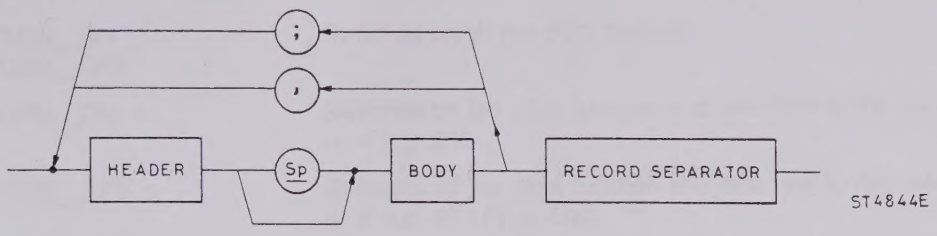
Service request mask (IEEE-488/IEC-625)

BIT	8	7	6	5	4	3	2	1	0
DECIMAL VALUE	256	128	64	32	16	8	4	2	1

BIT	DESCRIPTION	REASONS FOR SERVICE REQUEST
8	Instrument no longer busy	The PM2525/51 has made a measurement and sent it via the interface. It can now be triggered.
7	Not used	
6	Incorrect measurement	The PM2525/51 has made an incorrect measurement (e.g. overload, crest-factor exceeded, failure in a calibration measurement or a faulty Null measurement).
5	Internal failure	The PM2525/51 has an internal failure (e.g. No CAL).
4	Program failure	An illegal body or header in a command is received.
3	Not used	
2	Not used	
1	Hold mode	The hold mode is selected via the data hold probe. Also when the hold mode is released it can generate a service request.
0	Data available	Valid data is available in the output buffer.

1.2 Device programming

Coding syntax



Commands	Description
Function	
[FNC␣] xxx	xxx can be one of the following functions:

VDC = V⎓	I DC = A⎓	CAP = F
VAC = V∿	I AC = A∿	FRQ = Hz
VRM = V⎓∿	TDC = °C	TPP = s ⎍ ⎍
VPP = Vpp	RTW = Ω2W	TPN = s ⎍ ⎏
VPU = Vp+	RFW = Ω4W	TNP = s ⎏ ⎍
VPL = Vp−	DI O = ⏐▶—	TNN = s ⎏ ⎏
	CON = 🔊	

Ranging	
RNG␣A[UTO]	Auto-ranging
RNG ±xxxE±0x	The expected measuring value or the end-of-range can be programmed as range in scientific or technical notation. (e.g. RNG 3 or RNG 3E+03).
Speed/Resolution	
MSP␣n	n = integer between 1 (slow) and 3 (fast) to program the speed
RSL␣n	n = integer between 4 (low) and 6 (high) to program the resolution.
Function/Ranging	
VDC␣A [UTO]	V⎓, Autoranging.
VDC␣±aaaE±aa	The expected measuring value or end-of-range can be programmed as range in scientific or technical notation. (e.g. 3 or 3E+03)

dBm

DBM␣ON DBM␣OFF	Switches on/off the dBm function.
DBM␣ON, n	Switches on the dBm function and sets Rref to the value of A. n = e.g. 250
DBM␣OFF, n	Switches off the dBm function and sets Rref to the value of A. n = e.g. 5E+01 = 50Ω

Calibration

CAL␣ON, 0	Selects the cold calibration mode.
CAL␣ON, 1	Selects the hot calibration mode.
CAL␣OFF	Switches off the calibration mode.

MIN/MAX

MIN	Outputs MIN and the actual contents of MIN register.
MAX	Outputs MAX and the actual contents MAX register.
CLM	Clears MIN/MAX registers.

Output mode

OUT␣S	The whole measuring data string is output.
OUT␣N	Only numeric results are output.
OUT␣N,x	A numeric result is output with a length specified in x.

Trigger mode

TRG␣I	Internal triggering.
TRG␣B	Single triggering via IEEE/IEC bus.
TRG␣E	Single triggering via IEEE/IEC bus or DATA HOLD probe PM9267.

Start

X␣[1]	Starts a measurement

Note: [ ] means optional,␣means a space.

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ZERO

ZER_ON ZER_OFF	Switches on/off the ZERO function with the present value of the ZERO register.
ZER_M[EAS]	Enters the measured value as ZERO value and switches on the ZERO function.
ZER_ON, <value> ZER_OFF, <value>	Switches on/off the ZERO function and enters A as ZERO value. <value> = e.g. +1234.5E+00

1.3 Escape functions (RS232C/V24)

ESC1	Goto local
ESC2	Goto remote
ESC3	Goto local and unlock
ESC4	Device clear
ESC5	Local lock out
ESC7	Status Request
ESC8	Device trigger

1.4 Enable measurement output (RS232C/V24)

EMO_AUTO	Automatic output
EMO_[n]	n× output ($n < 2^{23}$)
EMO	1× output

2. Manual operation

2.1 Remote/local selection (IEEE-488/IEC-625)

Example	Operation	Display
Return to local if PM2525 is remote	SHIFT, CHECK	REM SHIFT rtl 0 ▼ (bl) SET
	1	REM SHIFT rtl 1 ▼(bl) SET
	ENTER	normal measurement

2.2 Talk only selection

Example	Operation	Display
Switch on Talk Only mode	SHIFT, CHECK, ENTER	t. only 0 SHIFT ▼ (bl) SET
	1	t. only 1 SHIFT ▼ (bl) SET
	ENTER RESET ○	TLK ONLY normal measurement
Switch off Talk Only mode	SHIFT, CHECK, ENTER	TLK ONLY t. only 1 SHIFT ▼ (bl) SET
	0	t. only 0 SHIFT ▼ (bl) SET
	ENTER RESET ○	normal measurement

2.3 Address (At delivery 22) selection (IEEE-488/IEC-625)

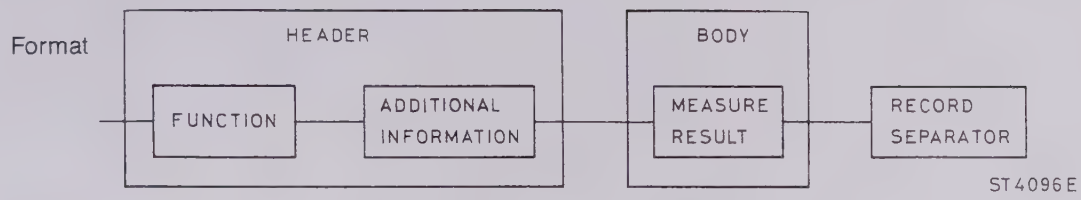
Example	Operation	Display
Check address	SHIFT, CHECK, ENTER, ENTER	Addr 22 ▼ (bl) SHIFT SET
	CLR	normal measurement
Modiffy addres to e.g. 11	SHIFT, CHECK, ENTER, ENTER	Addr 22 ▼ (bl) SHIFT SET
	1, 1	Addr 11 ▼ (bl) SHIFT SET
	ENTER	normal measurement

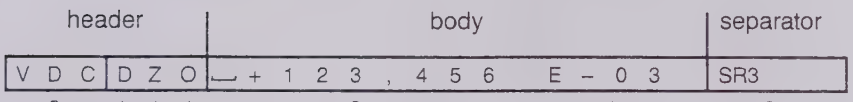
2.4 Separator

Example	Operation	Display
Check and add CR (Carriage Return)	SHIFT, CHECK, ENTER	SHIFT CR 0 ▼ (bl) SET
	ENTER, ENTER	
	1	CR 1 ▼ (bl) SHIFT SET
	ENTER	normal measurement

3. OUTPUT DATA

3.1 Measuring data





3 1 1 1 9 4 1 or 2 → 20 or 21 char.

1 or 2 — separator, default LF∧END (Also programmable via keyboard)

4 — exponent, incl. polarity.

9 — mantisse, incl. polarity and decimal point .
9999.999E+9 at overload and FAIL when calibrating.
(Number of 9's dependent on display length)

1 (3rd) — no calculation
Z zero set
C calibration measurement

1 (2nd) — no calculation
D decibell (dBm)

1 (1st)
? not measured result (forced output)
␣ normal measurement
O ADC overload
C crestfactor, clipping input circuit
U dBm underload
F Fail when calibrating
R Reduced accurate output (in between measurement)
N Not calibrated

3 —

VDC →	V⎓	TDC →	°C	DIO →	⏐▶|–
VAC →	V∼	VRM →	V∼	CAP →	F
RTW →	Ω2W	VPP →	Vpp	FRQ →	Hz
RFW →	Ω4W	VPU →	Vp+	TPP →	s ⎍ ⎍
IDC →	A⎓	VPL →	Vp–	TPN →	s ⎍ ⎏
IAC →	A∼	CON →	CONT 🔊	TNP →	s ⎏ ⎍
				TNN →	s ⎏ ⎏

3.2 Output of settings

COMMAND	DESCRIPTION	OUTPUT POSSIBILITIES
FNC_?	FUNCTION	FNC_V D C FNC_I D C FNC_V A C FNC_I A C FNC_R T W FNC_T D C FNC_R F W FNC_C A P FNC_V R M FNC_F R Q FNC_V P P FNC_T P P FNC_V P U FNC_T P N FNC_V P L FNC_T N P FNC_D I O FNC_T N N
RNG_?	RANGE	RNG_ _ _ _ _ _A U T O RNG_ x x x . E ± 0 x (x= numbers between 0-9 or Sp)
MSP_?	SPEED	MSP_1 MSP_3 MSP_2
RSL_?	RESOLUTION	RSL_3 RSL_5 RSL_4 RSL_6
TRG_?	TRIGGER MODE	TRG_I TRG_B TRG_E
OUT_?	OUTPUT MODE	OUT_S OUT_N
CAL_?	CAL MODE	CAL_OFF CAL_ _ON, 0 CAL_ _ON, I
ZER_?	ZERO	ZER_OFF, -34.56730E+03 ZER_ _ON, -34.56730E+03
DBM_?	dBm	DBM_OFF, +600.0000E+00 DBM_ _ON, +600.0000E+00

3.3 Dump

3.3.1 Settings dump

DMP Outputs instrument settings

Position: 1 5 10 15 20 25 30 35 40

Format : FNC␣VDC;RNG␣200.E+00;DBM␣OFF,+600.0000E+00;

45 50 55 60 65 70 75 80

ZER␣OFF,+.00000000E+00;MSP␣2;RSL␣5;TRG␣I:

85 90 95

CAL␣OFF:OUT␣S

3.4 Device status data

The device status data is represented in one status byte (8bits) and is built-up as follows:

bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
EX	RQS	AB	BSY	EF3	EF2	EF1	EF0

EX	Extension	Always 0.	
RQS	Request for service	RQS=0 RQS=1	No request for service. PM2525/51 has requested for service.
AB	Abnormal	AB=0	No abnormal condition. EF3 to EF0 contains status information.
		AB=1	Abnormal condition, specified in the bits EF3 to EF0.
BSY	Busy	BSY=0	Instrument is not measuring and the data of any previous measurement has been output.
		BSY=1	Instrument is measuring and/or data has not been output

EF3 ... EF0 Error/status information.
If AB=0 status information. If AB=1 error information.

AB	BSY	EF3	EF2	EF1	EF0	Description
0	0	x	x	x	0	No measurement is started and there is no data available.
0	1	x	x	x	0	A measurement is started but no data available.
0	1	x	x	x	1	Data is available, not yet sent via the interface.
0	x	x	x	1	x	Data HOLD mode is selected via the DATA HOLD probe PM9267.
0	0	x	x	x	1	Data available, not yet sent via interface.

Remarks:

- EF2 and EF0 are 0 (not used).
- EF1 generates a service request at every change of state. So at switching on and off the HOLD mode.
- BSY is set at receipt of a measuring-start command. BSY is cleared after output of measuring data.

AB	BSY	EF3	EF2	EF1	EF0	Description
1	x	x	x	x	1	Programming error
1	x	x	x	1	x	Internal error (e.g. No Cal)
1	x	x	1	x	x	Incorrect measurement OL overload CF crest-factor CL clipping CAL calibration

Remarks:

- One or more conditions can be specified, by the insrument, in the status byte.
- After a serial-poll, the bits AB and EF3 to EF0 are reset to zero.
- AB=1 has a higher priority than AB=0.